

US EPA ARCHIVE DOCUMENT

Chanute Air Monitoring Proposal

Background

The City of Chanute is located in Neosho County, Kansas. It has a population of approximately 8,800 and an approximate area of 2.6 square miles. The city has several potential sources of pollution including a rail yard, several industries supporting manufacture of recreational vehicles, metal fabrication, cement manufacturing, and others.

The Agency for Toxic Substances and Disease Registry (ATSDR), the Environmental Protection Agency (EPA), and the Kansas Department of Health and Environment (KDHE) have held several meetings in the community to collect information related to health concerns reported by the public. The information collected during discussions with local residents by ATSDR indicates that people in the Chanute area have a wide variety of health concerns.

KDHE undertook a study to review available public health data to respond to public health concerns raised in community meetings with the agencies. Representatives from the Division of Health within KDHE reported the results of investigations into health concerns raised in Chanute in a public meeting on October 29, 2010. One result reported was that the number of hospital discharges of children below fifteen years of age where the hospital visit involved asthma were elevated over those in Neosho County as a whole and over those in southeast Kansas based on review of five years of hospital discharge data from 2003-2006.

KDHE currently operates an ambient air monitoring site in Chanute, located at 1500 West 7th Street, on the roof of the KDHE Southeast District office. This monitoring site is equipped with a federal reference method sampler, has been in continuous operation since April, 1988, and has never measured a value that violates the current PM₁₀ National Ambient Air Quality Standard (NAAQS). Sulfur Dioxide was also monitored at this location for a fifteen month period spanning 1988 and 1989, with no values violating the SO₂ NAAQS. In their approved 2010 monitoring network plan, KDHE proposed to terminate the Chanute Total Suspended Particulate Matter sampler and to replace the current PM₁₀ High Volume sampler with a continuous monitor. In addition, as part of the approved Kansas five year network assessment, KDHE is considering moving the Mine Creek sampling site to Chanute to include PM and ozone monitoring.

In June 2003, a report was completed by the University of Kansas Medical Center and the University of Kansas, known as the Southeast Kansas Health Study. This study examined communities where hazardous waste combustion was taking place and included the communities of Chanute, Coffeyville, Fredonia, and Independence. This study investigated respiratory health, cancer incidence, and mortality rates in the communities. The study also included an extensive air quality monitoring component. Air quality monitoring was conducted in Chanute, Coffeyville, Fredonia, and Independence. In addition, monitoring sites were established in Sedan, Tyro, and Labette County to assess background air quality and pollutant transport. Pollutants measured included particulate matter (PM_{2.5} and PM₁₀), trace metal content in selected PM_{2.5} samples, ozone, nitrogen oxides, sulfur dioxide, and mercury content of wet and dry deposition. Selected volatile organic compounds (VOCs) also were monitored during the study. Particulate matter data (PM₁₀ and PM_{2.5}) was collected using Airmetrics portable mini-vol samplers equipped with filters which were deployed for 24-hour periods every six days. Gaseous pollutant data was collected using passive sampling devices which were deployed for thirty day periods.

Though the Southeast Kansas Health Study employed monitoring methods that are not considered to be equivalent to the federal reference method operated by the State of Kansas in Chanute, the data are useful for comparison to the national ambient air quality standards. PM₁₀ monitoring was performed at twenty-three different locations, once every six days, from 03/07/1999 to 2/24/2000, capturing approximately 45 samples per site in a year. The highest PM₁₀ concentration measured in this study was 139.03 µg/m³, measured in Independence; followed by 97.57 and 82.78 µg/m³, measured in Chanute.

In addition to reporting data for PM_{10} , the Southeast Kansas Health Study also measured $PM_{2.5}$ concentrations. $PM_{2.5}$ monitoring was performed at 14 different locations, once every six days, from 03/07/1999 to 10/24/2000, capturing 28 to 85 samples per site in a year. The highest concentration measured in this study was $55.05 \mu\text{g}/\text{m}^3$, measured in Independence; followed by 39.72 in Fredonia; and 35.56 in Independence. The highest $PM_{2.5}$ value measured in Chanute was $32.08 \mu\text{g}/\text{m}^3$. The $PM_{2.5}$ NAAQS is $35 \mu\text{g}/\text{m}^3$ measured over 24-hours. To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each monitor must not exceed $35 \mu\text{g}/\text{m}^3$. Therefore, though there were individual $PM_{2.5}$ values measured greater than $35 \mu\text{g}/\text{m}^3$, the standard is not violated.

Chanute Air Monitoring Study Objective:

There is a significant body of evidence indicating that there have been no NAAQS exceedances measured by health effect studies and air pollution monitoring designed to capture community-wide exposures to particulate matter in Chanute. There are also, however, community reports of episodic deposits of material on horizontal surfaces, release of particulate matter, and reports of odors in the community.

The objective of the particulate monitoring network design is to identify if particulate matter concentration gradients exist in Chanute which may not be captured north of the existing ambient air monitor at the KDHE Southeast District office.

The objective of the odor monitoring campaign is to sample, capture, and identify potential odor causing volatile organic compounds when they are detected and reported by the public.

In order to assess the potential impact of periodic PM and odor events, a screening level monitoring study is proposed to determine if more refined study of the area is warranted.

Sampling Design

Odors:

Because the odor complaints described in Chanute have been irregular and are of relatively short duration, the most appropriate sampling approach would be one that captures a broad range of compounds in a short amount of time with high sensitivity. The best sampling technology we have available to us that meets this objective is the evacuated SUMMA canister. The air sample captured in the canister is analyzed in a laboratory by EPA Method TO-15 for Volatile Organic Compounds (VOC) and the results used to screen for potential odor causing chemicals. Because odors are typically short duration and irregular in occurrence, it is desirable to have a single point of contact in Chanute who can respond on short notice to odors detected in the community.

Staff from the KDHE Southeast District office will be equipped with SUMMA canisters which are prepared to collect a grab sample on-site. The canisters are manually operated and require no power or additional support. Sampling duration for a canister grab sample is typically 8-10 seconds. Prior to initiation of odor monitoring, two grab canister samples will be collected in the community when there is no discernable odor present on different days to establish a typical background VOC profile. Upon collection of an odor sample, KDHE staff will attempt to identify the odor source; noting their field observations on the sampling documentation.

Individual VOC concentrations reported for samples collected during odor events will be compared to the average of the individual VOC concentrations collected in the two background samples to identify potential odor causing chemicals.

Members of the Chanute community will be given a telephone number to call when odor events are detected.

Particulate Matter:

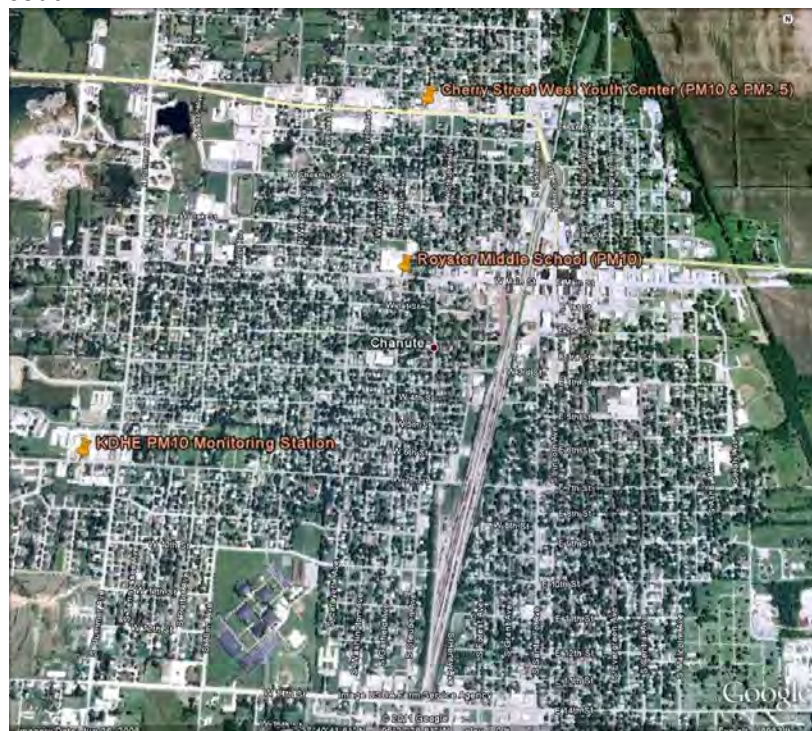
The particulate emissions experienced in the area are described as dust or flakes which are settled on horizontal surfaces such as automobiles and roof tops. This description leads to the conclusion that priority should be given to monitoring for PM_{10} . As seasonal winds in the Midwest typically prevail either northerly or southerly, the network will be deployed in a north-south orientation. (See Attachment 1)

Region 7 owns three portable beta attenuation monitors with associated meteorological sensors (Met One Instruments E-BAM). These monitors can be equipped to sample either PM_{10} or $PM_{2.5}$ and will report simultaneous hourly PM and meteorological data. The EPA monitors will require connection to uninterrupted electrical power and location in an area with unobstructed air flow. In order to obtain maximum spatial coverage and the best possible data capture, a PM_{10} monitor should be collocated with a $PM_{2.5}$ monitor at one location. The third monitor should sample PM_{10} at a second location. Both sites should be operated for three to six continuous months with a goal of characterizing PM concentrations under wind direction conditions that represent a historical distribution consistent with that portrayed by the Chanute wind rose (Attachment 1). The sampling and reporting frequency for PM measurements and meteorology will be hourly. EPA staff has visited the Chanute area and propose the following network deployment, contingent upon gaining property access.

Cherry Street West Youth Center (719 North Garfield Avenue) is proposed for collection of PM_{10} monitoring data. This proposed site is located approximately 1.2 miles north-northeast of the KDHE ambient air monitoring site at 1500 West 7th Street.

Royster Middle School (400 West Main) is proposed for collection of simultaneous PM_{10} and $PM_{2.5}$ monitoring data because it is situated near the geographic center of Chanute. This proposed site is directionally located approximately 0.9 miles north-northeast of the KDHE ambient air monitoring site at 1500 West 7th Street.

The two proposed monitoring sites are situated approximately 0.5 miles apart from each other north to south.



Intended Use of Screening Level Data

Odors:

Because the samples collected will be instantaneous in nature, the results will be used to identify the volatile organic compounds present at the location during sample collection. Due to the very short duration of sampling, however, the results will not be suitable for comparison to health-based exposure criteria. The purpose of this monitoring is to determine what chemical(s) may be contributing to odors. If chemicals of concern are identified from the grab samples, a more refined sampling approach may be proposed which is specific to optimal collection and analysis of longer duration samples to assess potential exposure levels.

Particulate Matter:

The monitoring data collected by the EPA PM₁₀ network will be compared to the data collected by the KDHE monitoring site at 1500 West 7th Street by calculating a daily 24-hour mathematical average of the values collected by each monitor, starting at midnight. Data from the KDHE monitoring site will be compared with simultaneously collected data from the proposed monitoring locations to discern if there is a PM₁₀ gradient in Chanute. PM_{2.5} monitoring data will also be averaged over 24-hours for comparison to simultaneously collected PM₁₀ data to discern the ratio of coarse mode (PM₁₀) to fine mode (PM_{2.5}) particles in Chanute. Hourly PM values will also be assessed for their relationship with meteorological data in order to infer the direction of potential sources of particulate matter that may be impacting the area.

Data Reporting:

Monitoring data and data analysis resulting from this study will be released in a final report which will be published within ninety days of completion of sample collection.

Attachment 1

